Holy spirit? An unusual cause of pseudomonal infection in a multiply injured patient

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A 19 year old man jumped from the tenth floor of his residential block of flats in February 1989, sustaining multiple life threatening injuries (table). He was taken to the major injuries unit of this hospital. On arrival, he was resuscitated, intubated, and electively ventilated. A chest drain was inserted; four quadrant peritoneal lavage was clear. Immediate surgical intervention followed (table). He received 53 units of blood and other resuscitation fluid.

After operative intervention the patient developed an episode of septicaemia due to *Staphylococcus aureus* and *Streptococcus pneumoniae*; this settled with appropriate intravenous antibiotic therapy including gentamicin. Subsequently he began a steady if unspectacular recovery from his catastrophic injuries. At two weeks he was breathing spontaneously supported by continuous positive airways pressure and at four weeks he was well enough to be interviewed by a psychiatrist. Initial total parenteral nutrition was replaced by feeding through a surgical gastrostomy. After six weeks the halo jacket and external pelvic fixation were removed. Repeated toilet and reconstructive surgery to the leg injuries was performed. Cranial computed tomography revealed small bilateral subdural haematomas, accounting for some fluctuation in mental state.

Suddenly the patient's condition deteriorated. He became confused and feverish, then developed tachypnoea and expectorated green sputum. Signs of pneumonia were seen in the right middle and lower zones of a plain chest radiograph; microbiological investigation showed *Pseudomonas aeruginosa* to be the causal agent. On the advice of our consultant microbiologist treatment was started with intravenous vancomycin and ciprofloxacin.

We were extremely concerned at the appearance of overwhelming pseudomonal infection on the major injuries unit, and as there were no other patients on the unit we were initially unable to establish a source for this infection. But one of us was present when the patient was visited by his aunt and saw her sprinkle him liberally with holy water. She was immediately stopped, and the remaining water was sent for microbiological investigation. *P aeruginosa* were found in pure culture and were indistinguishable on detailed phage typing from cultures grown from the patient; there were no other similar isolates from the hospital. Once the situation was explained the aunt immediately stopped sprinkling with holy water.

Injuries sustained and initial intervention

Injury	Intervention
Unstable cervical spine injury at C6	Halo traction
Compound facial skull fracture	Frontal intracranial pressure bolt inserted
Multiple rib fractures	
Pneumothorax	Chest drain inserted
Complex pelvic fractures	External pelvic fixation
Fracture of right tibial plateau	External fixation
Bilateral compound lower limb fractures with almost complete destruction of the left hind foot	No intervention
	Tracheostomy

The patient subsequently recovered rapidly to his state before infection, although he remained a little confused at times. After further surgery he was discharged home almost exactly three months after his admission. Further management consisted of complex bilateral foot surgery to improve both his gait and his appearance. He remains under review and has (reluctantly) received intensive help from psychiatric and rehabilitation services.

We know of no other case of life threatening infection transmitted in this way. We suspect that such transmission is, in fact, more common than realised and may represent a significant source of infection in critically ill patients that will not be noticed unless specifically sought.

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A piscatorial epistle

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Fish species have been implicated in causing human disease throughout the world in multitudinous ways. In Papua New Guinea there have been cases of scombrotoxic poisoning,[1,2] tetrodotoxic poisoning (B Mavo and A J Trevett, unpublished), impalation by garfish and swordfish,[3,4] stingray injuries and envenoming,[5] shark bites, stonefish envenoming,[6] lion fish envenoming, and impacted fishbones. We are not, however, aware of any reports of respiratory obstruction due to swallowing live fish, and we report two such cases.

Case reports

Case 1—A 14 year old boy was admitted to Moreguina health centre with a history of acute respiratory difficulty. He had been out spear fishing and had attempted to kill, by biting, a small reef fish. The fish had lodged in his pharynx, and he rapidly became blue and collapsed. On arrival he was apnoeic, pulseless, and cyanosed. A fish tail was seen protruding from his pharynx. Resuscitation was attempted but was unfortunately unsuccessful. A 14 cm specimen, probably a mado (*Atypichthys mado*), was later removed from his throat.

Case 2—A 10 year old boy was admitted to Kupiano health centre after swallowing an 8 cm live reef fish. He had dislodged the fish from a net and attempted to kill it by biting it behind the eye. Unfortunately he had lost hold of the writhing creature, which bolted down his throat. He was understandably distressed and tachypnoeic but not cyanosed. There was no stridor,

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and air entry seemed satisfactory. On examination the tail could be seen protruding from his pharynx. An attempt was made to remove the fish with forceps, but unfortunately it slipped from the grip and disappeared down his oesophagus. After 30 minutes of dysphagia and a disconcerting few days the boy made an uneventful recovery. The fish was not seen again.

Comment

The traditional fishing methods used around the coastal waters of Papua New Guinea include netting, spear fishing, and releasing plant poisons into the water. Fish dislodged from nets and spears or stunned by poison are commonly killed by biting them behind the eye, which breaks the spinal column. The fisher can continue fishing without having to return to the boat with each wriggling catch. As well as being convenient, this is also said to diminish the risk of attracting sharks, which may be alerted by fish struggling underwater.

In the coastal villages of Central province, boys are taught to kill fish safely at an early age. Normally the fish is bitten while it is still entangled in the net or impaled on the spear, which diminishes the chance of accidents. In addition, the fish should be angled sideways and the crushing performed with the canine rather than the incisor teeth. If the fish slips it then tends to fall free of the mouth.

Both of our cases resulted from attempts to kill the prey by biting its head and the fish slipping into the oropharynx. Although one of the more unusual causes of respiratory obstruction, a live fish is no less devastating than any other and demands swift action.

1 Schuurkamp GJ, Sabuin RH, Kereu RK. A report of scombroid fish poisoning from skipjack tuna (*Katsumonus pelamis*) at Tabubil, Western Province, Papua New Guinea. *Papua New Guinea Medical Journal* 1987;30:203-6.
2 Barss PG. Scombroid fish poisoning at Alotau. *Papua New Guinea Medical Journal* 1985;28:131.
3 Barss PG. Penetrating wounds caused by needle-fish in Oceania. *Med J Aust* 1985;143:617-8, 621-2.
4 Barss PG. Wound necrosis caused by the venom of stingrays. Pathological findings and surgical management. *Med J Aust* 1984;141:854-5.
5 Campbell CH. Stingray injuries. *Papua New Guinea Medical Journal* 1960;4: 71-2.
6 Campbell CH. The stone-fish sting and its treatment. *Papua New Guinea Medical Journal* 1959;3:55.

That sinking feeling

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After a patient with multiple joint replacements sank on her first visit after surgery to a swimming pool, we investigated the effect of joint replacement surgery on buoyancy. Knee replacement surgery decreases the buoyancy of the legs and may make swimming difficult. We looked at the role of buoyancy aids in preventing this previously unrecognised problem.

Case report

A 67 year old woman with longstanding rheumatoid arthritis had been a keen and strong swimmer before developing arthritis. She had not attempted swimming since 1983 because of her stiff and painful joints. Since then she had bilateral knee replacements, a left shoulder replacement, and a right elbow replacement. In April, 18 months after her last surgery, she felt well enough to return to swimming and paid a visit to a local swimming pool, where she sank.

Comment

Buoyancy of the human body is chiefly due to the gas filled viscera of the thorax and abdomen. The limbs tend to sink if stationary in the water. The added weight of shoulder and hip replacements should be supported by the buoyant trunk. Elbow replacements add very little extra weight, but knee replacements are heavy (table) and peripheral to the centre of buoyancy and so may alter flotation.

Weight of knee joint replacement

	Weight (g)
Knee replacement	370
Bone excised	55
Cement used	40
Net increase	355

To investigate this problem further a young, former commercial diver with rheumatoid arthritis who had had a hip replacement and a shoulder replacement was taken to the hydrotherapy pool before a total knee replacement. He could float on his back without moving his limbs. With a knee prosthesis attached externally to each side of his waist, flotation was unaltered, but when knee prostheses were attached externally to each knee his legs sank.

This alteration to his flotation did not affect his ability to swim, but with postoperative weakness it could cause lack of confidence in the water. Inflatable arm bands around the ankles easily corrected for this sinking tendency (figure).

Neoprene knee or ankle supports, which have intrinsic buoyancy, would be more practical. A medium neoprene knee brace will support half the weight of a medium knee prosthesis; with two neoprene knee braces buoyancy should be returned to normal. A greater moment of buoyancy is achieved if a

Compensating for the added weight of replacement knee joints

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